CROW INDIAN TRIBE

Resources Report

VEGETATION

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The Statewide Draft Oil and Gas EIS provides descriptions of five plant communities in the planning area: grasslands, shrublands, forests, riparian areas, and barren lands. It presents total acreage's for various vegetative types, indicates general distribution of each within the state, and indicates number of native terrestrial vertebrate species predicted for each vegetative type.

Vegetation in the Southeastern Part of the Crow Reservation

The area being considered to contain economic coal beds is in the southeastern part of the Crow Reservation, which includes the Wolf Mountains area. This sub-section will therefore attempt to focus primarily on the vegetation occurring in that area.

Native vegetation occurring on the various soils types in Big Horn County is presented in the 1979 Soils Survey publication. The vegetation associated with the soils types that appear to predominate in the southeastern part of the reservation are presented below in *Table 13* (U.S.D.A. Soil Conservation Service et al. 1979).

Figure 15 is a generalized vegetation map for the Crow Reservation. *Figure 16* shows soils for different types of vegetation.

TABLE 13
VEGETATION OF PREDOMINANT SOILS TYPES
IN SOUTHEASTERN CROW RESERVATION

Doney Series	Reeder Series	Wayden Series	Regent Series	Ringling Series	Searing Series	Arnegard Series	Shale Outcrop
Bluebunch wheatgrass, Hoods phlox, lupine, western wheatgrass, sagebrush, green sagewort	Idaho fescue, prairie junegrass, Indian paintbrush, Hoods, phlox, lupine, big sagebrush	Bluebunch wheatgrass, scurf pea, broom snakeweed, western wheatgrass	Western wheatgrass, Idaho fescue, timber danthonia, rubber rabbitbrush, slender wheatgrass	Bluebunch wheatgrass, Idaho fescue, Sandberg bluegrass, ponderosa pine	Dryland sedges, Idaho fescue, fringed sagewort, green sagewort, cudweed sagewort	Sandberg bluegrass, green needlegrass, snowberry, horsemint	Mono lepis, white loco-weed, grease-wood

Source: U.S.D.A. Soil Conservation Service et al. 1979

Certain kinds of soil may be more difficult to revegetate than others after they have been disturbed. These soils include those on slopes greater than 15%; shallow soils such as the Wayden and Ringling soils; saline soils, and soils with strong accumulations of carbonates or gypsum in the subsoil. It may be difficult to establish vegetation on areas of rock (and shale) outcrop, if disturbed.

VEGETATION ON THE CROW INDIAN RESERVATION

Base Map Developed By:
RMR for Crow Tribe Resource Development and Land Use Plans

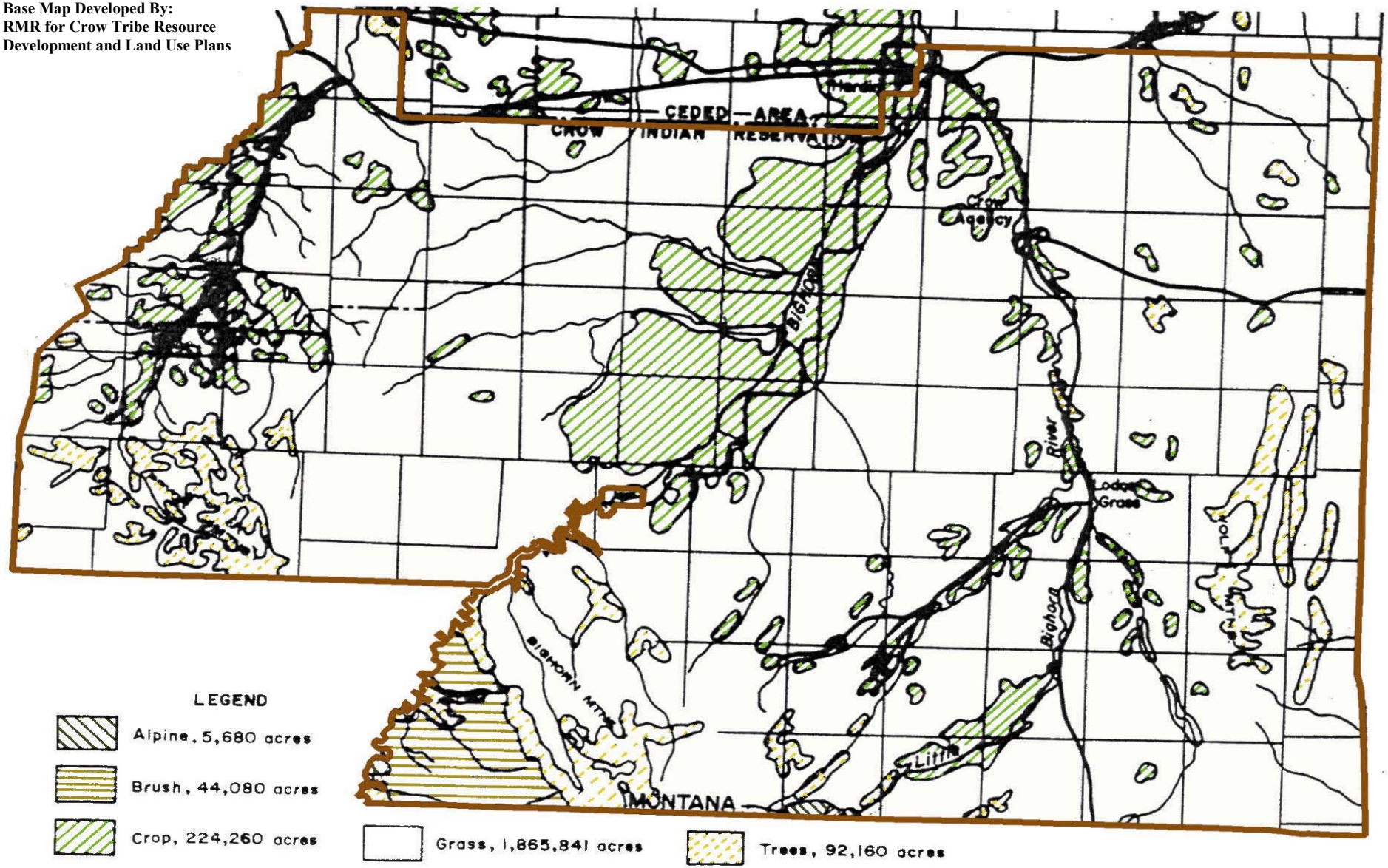

Figure 15
Vegetation

Report developed by
LAO Environmental
Billings, Montana

SOILS ON THE CROW INDIAN RESERVATION

Base Map Developed By:
RMR for Crow Tribe Resource Development and Land Use Plans

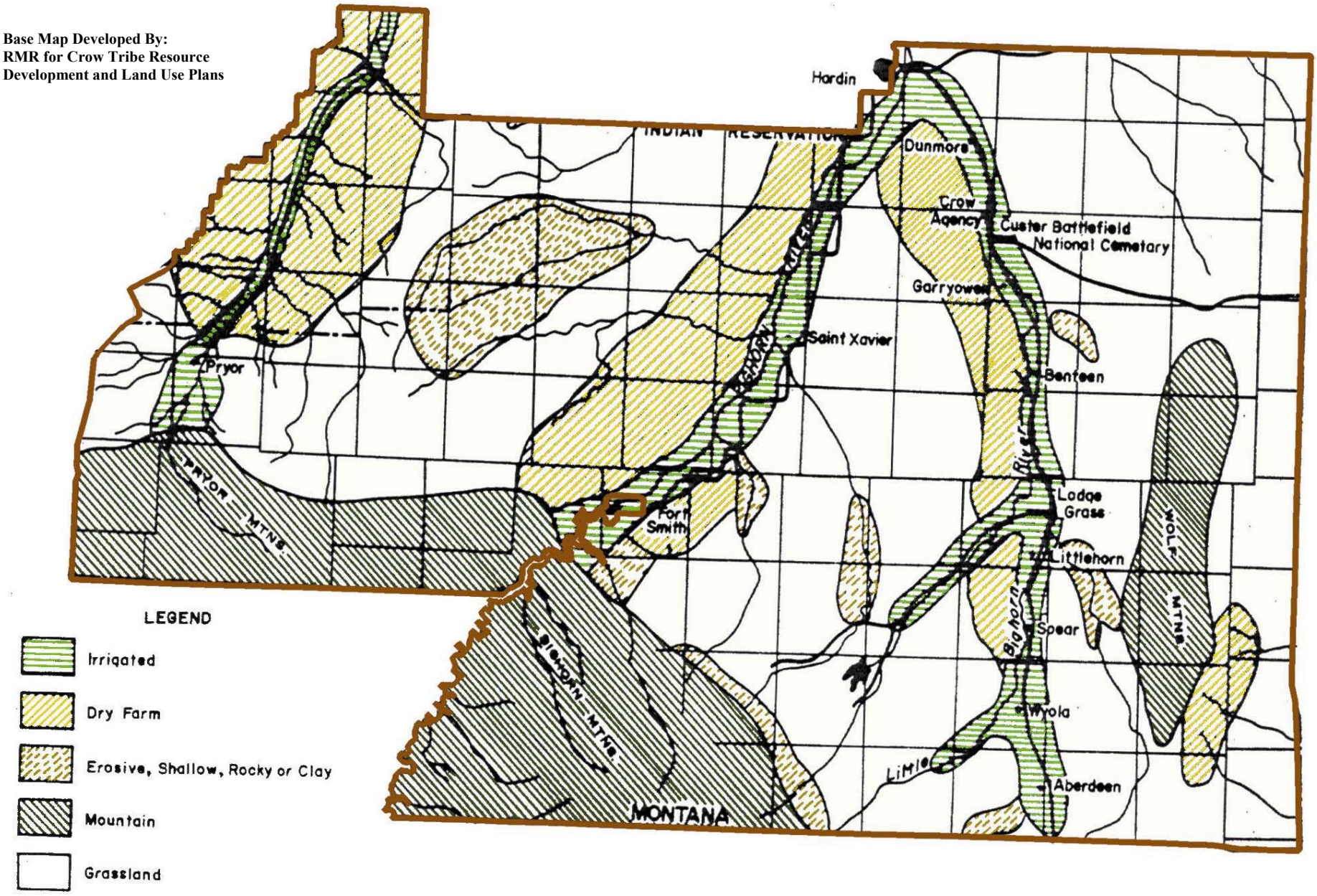

Figure 16
Soils

Report developed by
LAO Environmental
Billings, Montana

At higher elevations the frost-free season is about 90 days, which limits selection of adapted species for revegetation. In other areas, revegetation success may be limited by inadequate precipitation (BIA 1983).

Rangeland

Native rangeland is the largest land cover type on the reservation. Rangeland is used primarily for livestock grazing and wildlife habitat. The vegetation type on it is predominantly mixed grass prairie in the lowlands, and a combination of mixed grasses and Ponderosa Pine, Rocky Mountain Juniper, and Douglas Fir in the foothills and mountains (Crow Tribe et al. 1997).

In 1971, most of the range on the eastern Crow Reservation was listed as being in good or excellent condition. For the next decade, the trend in condition of that rangeland was said to be upward, partly because of the many water developments such as stock ponds and water troughs at springs (BIA 1983). However, range condition has declined significantly over the past 20 years east of the Little Bighorn River.

Although all the watersheds evaluated in 1997 had some level of serious rangeland resource problems, the Little Bighorn watershed was one of two with the highest amount of poor condition rangeland, downward trend (i.e., worsening condition), and excessively grazed land (Crow Tribe et al. 1997). To ensure no unacceptable additional degradation to rangeland occurs from coal development/production, site specific studies should be performed.

The natural vegetation occurring in southeastern Montana, including the area containing the economic coal beds has been described as follows.

> *"Natural vegetation in this region is quite varied due to the wide range in elevation and topography. The most common grass species are western wheatgrass, green needlegrass, needle-and-thread, little bluestem, blue grama, and sideoats grama. Various mid- and tall-grass species, such as switchgrass, Indian grass, big bluestem, prairie sandreed, little bluestem, sand lovegrass, and needle-and-thread, are found in the sandhills with prairie cordgrass, rushes, and sedge in wetter sites"* (BLM 1992).

Some rangeland and forestland overlap. In the vicinity of the Wolf Mountains, cattle are grazed at lower elevations in the winter, but are grazed at higher elevations from about May 1st to November 1st (BIA 1983).

The Billings Resource Area covers eight counties, including Big Horn County. A Resource Management Plan written in 1983 for the Billings Resource Area stated that vegetative manipulations should occur in areas containing dense stands of sagebrush, dense stands of crested wheatgrass, and dense stands of noxious weeds (primarily leafy spurge). Dense stands of sagebrush adversely affect watershed conditions, wildlife habitat, and livestock forage through reduction in both the quality and amount of vegetative production. Crested wheatgrass had been planted primarily to stabilize the soil (BLM 1983).

Forestland

Figure 17 is a generalized map depicting the location of forested lands on the Crow Reservation.

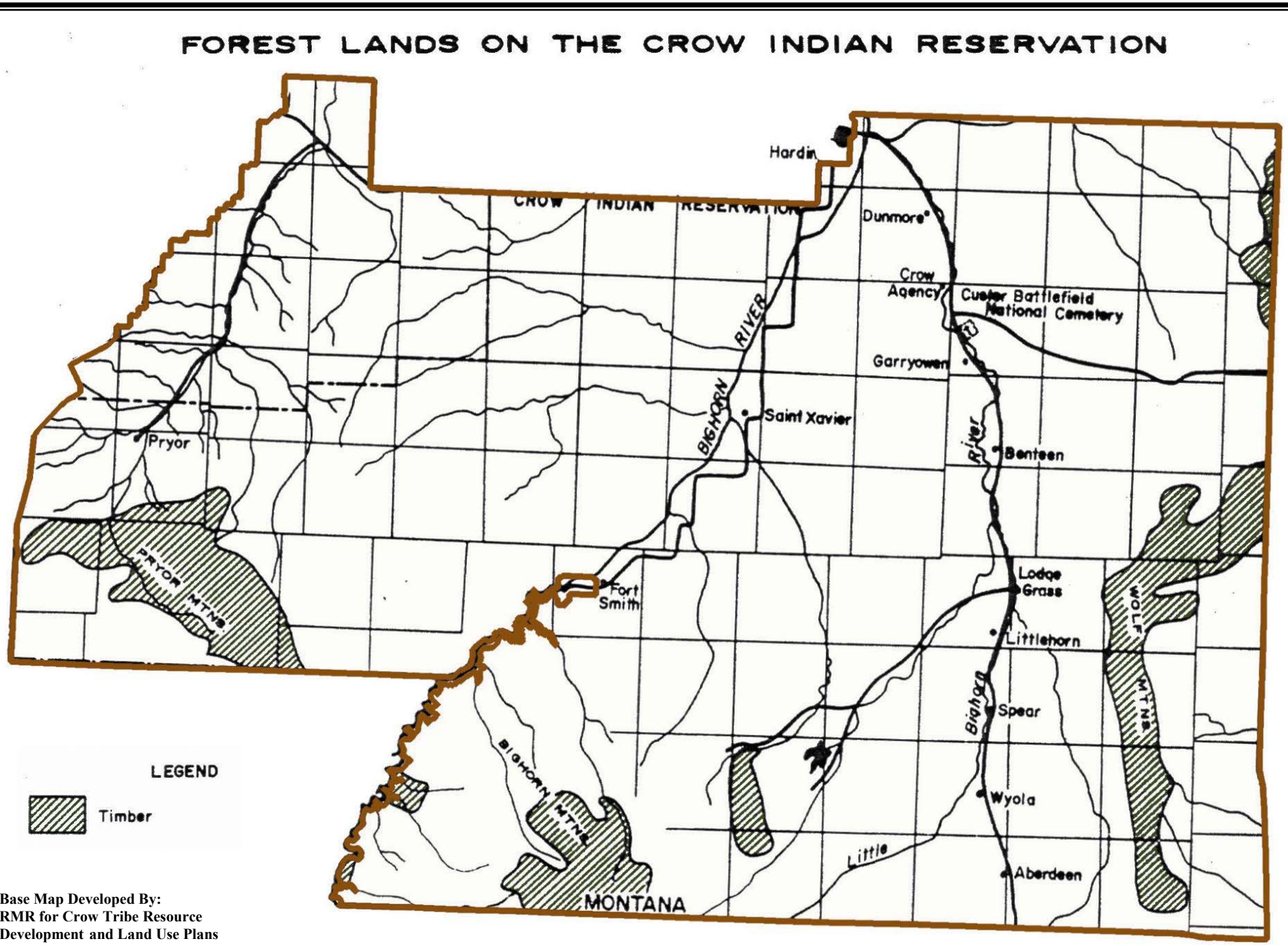

Figure 17
Forest Lands

Report developed by
LAO Environmental
Billings, Montana

Ponderosa Pine forest vegetation is distributed over a large portion of the southeastern part of the Crow Reservation in relatively high elevations where annual precipitation ranges from 20 to 24 inches. The dominant topographic feature of this area is the Wolf Mountains and adjacent foothills and lower slopes. The dominant tree species is ponderosa pine. Associated tree species include aspen, American plum, hawthorn, and chokecherry. These species form a closed or semi-closed canopy in most areas (BIA 1983).

Ponderosa pine woodland can be considered a vegetation type that is essentially transitional and intermediate between the ponderosa pine forest, grassland, and sagebrush shrubland types. It is distributed over a large portion of the intermediate elevation area of the southeastern part of the Crow Reservation where annual precipitation ranges from 15 to 19 inches.

The dominant tree species are ponderosa pine and other species, including Rocky Mountain juniper. Individual trees in this type are widely spaced. Common shrubs include skunkbush sumac and common snowberry. Common ground stratum species include most of the species considered to fall under the grassland type (BIA 1983).

The 1997 Big Horn County Resource Assessment recommended that some management considerations for non-commercial forest species should be explored. It noted that some interest had been expressed in the management of plains cottonwood, quaking aspen, and native fruit bearing trees (i.e., chokecherry and wild plum) for cultural resources. It concluded that areas should be managed where these trees exist, to encourage more growth and establishment in new areas (Crow Tribe et al. 1997).

Forestland vegetation in the Wolf Mountains has recently been described as follows (Crow Tribe et al. 1997):

> *"The forest is almost exclusively ponderosa pine with a rare occurrence of Douglas fir. The moist north and east slopes are often a mixture of serviceberry, hawthorn, mountain maple, thimbleberry, choke cherry, and common snowberry plant communities."*
>
> *"The contrasting south and west slopes support a mix of grassland and semi-open ponderosa pine/bunchgrass forest. Fire has played a role in shaping the character of these stands. Understory vegetation includes Oregon grape, Idaho fescue, and Ross sedge."*
>
> *"The driest margins of the forest support scattered stands of limber pine and Rocky Mountain juniper. These areas include exposed, dry ridges, steep south faces, and gravelly toeslopes. At the opposite end of the spectrum, quaking aspen, cottonwood, green ash, and box elder stands are pretty much confined to stream bottoms and wet draws."*

Timber Resources

Logging activities began on the Crow Reservation in the 1920s. In 1980 the first Continuous Forest Inventory (CFI) of the reservation forestlands was conducted. The purpose of the CFI is to track the forest over time, providing an accurate representation of volume, cutting, growth, and mortality. For the first CFI, 434 plots were installed in the Wolf Mountains, and 400 were

located in the Pryor Mountains. The Bighorn Mountains were not sampled since they were designated as cultural and recreational reserves.

Based on information from the forest inventory, a 10-year forest management plan was developed in 1987, which directed that all commercial forestlands in the Wolf and Pryor mountains be intensively managed under a policy of sustained yield. The primary goal of sustained yield is to assure that the forest produces the same amount of timber each year, so that the associated benefits are perpetuated. A second CFI was performed in 1993 to measure the effects of the 10-year forest management plan (Crow Tribe et al. 1997).

The forest management plans and forest inventories have ensured the forest resources on the Crow Reservation as a whole are well managed. Demand for reservation timber is likely to increase as other sources are depleted. The Crow Tribe is in a good position to market its timber coupled with favorable prices (Crow Tribe et al. 1997).

On average, Montana's forestlands are moderately productive. Potential productivity varies across the state and by ownership status. Productivity is much higher west of the divide due to the moisture associated with the Pacific maritime air masses that dominate the climate over that part of the state. Of six general areas within the state, the ranking from highest to lowest potential productivity is Northwest, West-central, Southwest, Central, Southeast, Northeast. The potential productivity of Southeastern Montana was listed in the referenced document as 41 $ft^3/ac/yr$ (Montana Fish Wildlife and Parks 2002).

Ponderosa pine is the only commercial tree species in the Wolf Mountains. Both 2x4s and boards are manufactured from this species. In the early 1980s almost 2000 board-feet of timber was commercially harvested per year. At that time, timber harvest activities were occurring in Townships 5S, 6S, 7S and Range 37E. Also at that time woodcutting by private parties for home heating was not a significant activity on tribal or allotted land (BIA 1983). To ensure no unacceptable degradation to valuable timber resources occurs from coal development/production, site specific studies should be performed.

Riparian Zones

Riparian zones are defined as a specialized form of wetland producing specific kinds of vegetation. Although they cover relatively small areas, these zones are very important for wildlife habitat, livestock grazing, streambank stabilization, and water quality (BLM 1983). Riparian zones function to provide stream bank stability, filter nutrients and trap sediment from instream and overland flows (BLM 1992).

Riparian zones are among the most productive ecosystems. Characteristically, they display a greater diversity of plant, fish, wildlife, and other animal species and vegetative structure than adjoining ecosystems. Some of the more common plant species that occur in riparian-wetland areas include prairie cordgrass, switchgrass, Canada wildrye, western wheatgrass, sedges, rushes, willow, chokecherry, buffaloberry, and plains cottonwood (BLM 1992).

Riparian zones are the smallest land cover type in the Crow Reservation (Crow Tribe et al. 1997). They are used disproportionately more than any other vegetation type for livestock grazing, watering, shade, and travel; and wildlife habitat (BLM 1984). Riparian areas are being

most affected by livestock in watersheds that include the Upper Tongue Watershed (Crow Tribe et al. 1997).

Riparian woodland can be considered to be a vegetation type that occurs in narrow, linear strands along the floodplains and banks of rivers and streams. Dominant tree species in this type in the area include cottonwood, boxelder, green ash, sandbar willow, and American plum. Tree canopy cover ranges from open to closed. A relatively large number of understory shrub, grass, and forb species also occur in riparian woodland (BIA 1983).

The Big Horn County Resource Assessment presented the results of a county-wide streams evaluation. Individual streams determined to be at risk were not indicated, but the publication listed the number of miles of streams in each watershed that were functioning properly, functioning at risk, or most seriously, not functioning. Of the three watersheds draining the southeastern part of the reservation (the Little Bighorn, the Rosebud, and the Upper Tongue), only 1%, 2%, and 0% respectively, were not functioning. However, 53%, 58%, and 61% respectively, were functioning at risk.

Cropland encroachment in the riparian zone was the major impact to both the Little Bighorn River and Rosebud Creek watersheds that caused them not to be rated as properly functioning (although grazing management practices also played a role). Grazing management impacts were the primary cause of the Upper Tongue River Watershed to be rated as functioning at risk (although cropland encroachment was also a problem) (Crow Tribe et al. 1997). To ensure no unacceptable degradation to riparian zones occurs from CBM development/production, site-specific studies should be performed.

Cropland

The Soils Technical Report to the Statewide Draft Oil and Gas EIS includes maps that show agricultural areas within each RMA. According to the map, in the Wolf Mountains area, there appears to be few agricultural lands, and of those, slightly more crops are irrigated than not. The largest farm is located on the eastern border of the reservation, and by referring to more detailed maps, appears to be immediately north of the North Fork of Rosebud Creek. About five or six other isolated small farms are shown on the map in the Wolf Mountains area (ALL Consulting 2001).

Soil Health in terms of individual watersheds was evaluated in the Big Horn County Resource Assessment (Crow Tribe et al. 1997). It may be useful to mention some of the reasons for impairment of cropland.

In the Little Bighorn watershed, the Doney-Reeder-Wayden soil type is used for dry crop-fallow and its overall soil health was rated as “impaired.” Reasons for impairment for the dry cropland were (Crow Tribe et al. 1997):

- Use of a winter wheat/summer fallow monoculture rotation, which promotes winter annual weeds;
- Use of persistent herbicides to control problem weeds, which limits cropping sequence selections; and
- Low soil surface cover during the summer fallow year creates an environment for wind and water erosion.

In the "Wolf Mountains Area" watershed (which, in that publication, is defined in cropland assessments to include the Upper Tongue, Lower Tongue and Rosebud watersheds), the Wayden-Regent-Shale soil type is used for dry crop-fallow and its overall health was rated as "unhealthy." Reasons for the impairment for the dry cropland include (Crow Tribe et al. 1997):

- Water erosion in the forms of sheet and rill are prevalent in both crop and fallow areas. This erosion does not exceed soil loss tolerances based on erosion calculations, but it does have a dramatic affect on other factors involved in soil health.
- Soil organic matter levels are low and soil tilth is poor due to cropping sequence and tillage practices.
- Persistent herbicides are used to control problem weeds, limiting cropping sequence selections.
- Water infiltration is low.
- Soil moisture management is poor. Adequate moisture is available for recropping in the upper portions of the area, but a crop/fallow cropping sequence is followed instead.

The Big Horn County Resource Assessment presents a variety of information on a county-wide basis and/or on a Crow Reservation-wide basis, such as: acres of dry cropland, acres of open grazing, and acres of forest, 1995 harvested crop acres and average yield for various crops, typical fertilizer rates for various crops, typical pest management for various crops, and wildlife habitat evaluation.

Imperiled Plant Species and Noxious Weeds

The Vegetative Appendix to the Statewide Draft Oil and Gas EIS lists critically imperiled plant species in the 16-county area, and presents a short habitat description for each. It lists ten plants known to occur in Big Horn County: Barr's Milkvetch, Pregnant sedge, Yellow bee plant, Nuttal's desert parsley, Wooly twinpod, Platte cinquefoil, Cut-leaf groundsel, Slender wedgegrass, Letterman's needlegrass, and Nannyberry.

According to the Natural Heritage Program (http://nhp.nris.state.mt.us/plants/), three additional vascular species in Big Horn County are in the BLM's Special Status Species list: Sweetwater Milkvetch (Astragalus areetioides), Joe Pye Weed (Eupatorium maculatum var bruneri), and Purpus' Sullivantia (Sullivantia hapemanii var hapemanii). Also listed by the Montana Natural Heritage Program as a Species of Special Concern in Big Horn County, is an additional plant, Tall Centaury (Centaurium exaltatum).

Weeds destroy wildlife habitat by choking streams and crowding out species of plant life; they create fire hazards, poison and injure livestock and man, and foul recreation sites. Weeds cost farmers in crop losses and in herbicides applied to suppress weeds. The spread of noxious weeds signals the decline of entire neighborhoods. They severely impact the beauty and biodiversity of natural areas and cause economic ruin.

The Vegetative Appendix to the Statewide Draft Oil and Gas EIS presents a list of 26 noxious weeds in Montana. Three of them are listed as being found in small, scattered localized infestations only. Nine are regarded in the table as recently introduced and rapidly spreading. Fourteen are classified as currently established and generally widespread in many counties. Noxious plant species found growing in the adjacent Powder River Resource Area in the early 1980s were field bindweed, Canada thistle, leafy spurge, Russian knapweed, hoary cress, and

spotted knapweed. All of these are also listed as Montana noxious weeds in the Statewide Draft Oil and Gas EIS, in the final category described above.